

THE CLAIMS

1. (Previously presented) A medical instrument for use in an image guided surgery system, comprising:

a support member operatively connected to a flexible engaging member having an operative distal tip; and

a strain gauge affixed to an outer portion of said flexible engaging member, wherein said strain gauge detects movement of said operative distal tip of said flexible engaging member.

2. (Original) The medical instrument of claim 1, wherein a resistance of said strain gauge changes when said flexible engaging member deflects.

3. (Original) The medical instrument of claim 2, wherein said strain gauge is within an electrical circuit in which a potential difference occurs when said resistance of said strain gauge changes.

4. (Original) The medical instrument of claim 1, wherein said flexible engaging member is one of a needle, catheter, curette, and K wire.

5. (Original) The medical instrument of claim 1, further comprising at least one additional strain gauge affixed to said flexible engaging member.

6. (Original) The medical instrument of claim 1, wherein said portion of said flexible engaging member is proximate to said support member.

7. (Previously presented) An image guided surgery system, comprising:
a medical instrument having a flexible engaging member operatively connected to a support member, said flexible engaging member having a deflectable operative distal tip
at least one of an electromagnetic, optical, inertial position, and ultrasound tracking system configured to track said medical instrument; and
a deflection tracking system configured to track said flexible engaging member of said medical instrument, said deflection tracking system comprising at least one strain gauge affixed to an outer portion of said flexible engaging member in order to detect movement of said deflectable operative distal tip.
8. (Original) The image guided surgery system of claim 7, wherein a resistance of said at least one strain gauge changes when said flexible engaging member moves.
9. (Original) The image guided surgery system of claim 8, wherein said at least one strain gauge is within an electrical circuit in which a potential difference occurs when said resistance of said strain gauge changes.
10. (Original) The image guided surgery system of claim 9, further comprising a processing unit that correlates said potential difference with an amount of movement of said flexible engaging member.
11. (Original) The image guided surgery system of claim 7, further comprising a display for showing a position of said medical instrument within an operating area of a patient.

12. (Original) The image guided surgery system of claim 7, wherein said flexible engaging member is one of a needle, catheter, curette, and K wire.

13. (Previously presented) The medical instrument of claim 7, wherein said portion of said flexible engaging member is proximate to said support member.

14. (Previously presented) A method of navigating a medical instrument having a flexible engaging member having an operative distal tip, the method comprising:

tracking the medical instrument with a first position tracking method that tracks a proximal end of the medical instrument; and

using a second tracking method to track movement of the operative distal tip of the medical instrument, wherein said using comprises affixing a strain gauge on an outer portion of the operative distal tip of the medical instrument in order to detect movement of the operative distal tip.

15. (Previously presented) The method of claim 14, comprising measuring a change in voltage that arises from a change in resistance of the strain gauge upon deflection of the operative distal tip.

16. (Previously presented) The method of claim 15, wherein said affixing comprises affixing the strain gauge on the portion of the flexible engaging member that is proximate a support member of the medical instrument.

17. (Previously presented) The method of claim 15, wherein said affixing comprises affixing at least one other strain gauge on the outer portion of the flexible member of the medical instrument.

18. (Previously presented) The method of claim 15, further comprising correlating the change in voltage to an amount of deflection of the flexible engaging member.

19. (Original) The method of claim 14, further comprising combining data received from said tracking and using and displaying a position of the medical instrument based on the combined data.

20. (Original) The method of claim 14, wherein said first tracking method comprises one of an electromagnetic, optical, inertial position and ultrasound tracking method.

21. (Previously presented) The medical instrument of claim 1, wherein said strain gauge provides information regarding a location of said operative distal tip in relation to a longitudinal axis of said support member.

22. (Previously presented) The image guide surgery system of claim 7, wherein said at least one strain gauge provides information regarding a location of said deflectable operative distal tip.

23. (Previously presented) The method of claim 14, wherein said affixing the strain gauge on the outer portion of the operative distal tip of the medical instrument in order to detect movement of the operative distal tip provides information regarding a location of the operative distal tip.